

Evaluating Grit Through the use of MathSpring in Individualistic and Collectivist Cultures

Research Questions



- How do students display their grit and how can we effectively assess grit within Mathspring?
- Can grit be different between an individualist and collectivist culture? Between the US (individualistic) and Argentina (collectivist)?
- Can we effect grit by training growth-mindset in MathSpring? Can grit improve thanks to the messages delivered by characters who train their perseverance and effort?

Participants in a Nutshell



- United States Data
 - Collected in 2017-2018
 - N = 324
 - Students are primarily 6th to 7th graders
 - Only have post test data

- Argentina Data
 - 3 Middle Schools
 - N: 2 section
 - AA: 3 sections
 - B: 2 sections
 - N = 179
 - All 6th graders
 - Obtained pretest and post test data

Procedure



- Met with each section at least once a week for 5 weeks for around 45 minutes
 - Day 1 = pretest + troubleshooting
 - Day 5 = post test
- Each day there were different problem sets available to the students
- One school also did MathSpring in English one day and Spanish another day

Summary of Data Collected

RQ1:

134

Pretest

134

Post Test

RQ2:

257

United States

150

Argentina

RQ3:

134

Pretest & Post Test

Results in a Nutshell



RQ1:

- Argentina pretest and post test
- Correlation + regression analyses
- Nothing to call home to

RQ2:

- US post test vs. Argentina post test
- Independent-samples T-test
- Argentina students had a larger post test grit ($p = 0.02$)

RQ3:

- Argentina Pretest vs. Argentina Post test
- Paired-Samples T-test
- Argentina participants saw an increase in grit post test means after using MathSpring ($p < 0.01$)

Table 7: *T-test results and descriptive statistics of post test grit mean by country.*

	Country						95% CI for Mean Difference	t	df
	United States			Argentina					
	M	SD	n	M	SD	n			
Grit mean	3.30	0.62	257	3.44	0.56	150	-0.26, -0.02	-2.34*	405

* $p < .05$.

T-test for RQ2

Table 14: *T-test results and descriptive statistics of change in grit.*

	Pretest			Posttest			95% CI for Mean Difference	t	df
	M	SD	n	M	SD	n			
Grit mean	3.25	0.54	134	3.44	0.58	134	-0.27, -0.10	-4.11*	133

* p < .05.

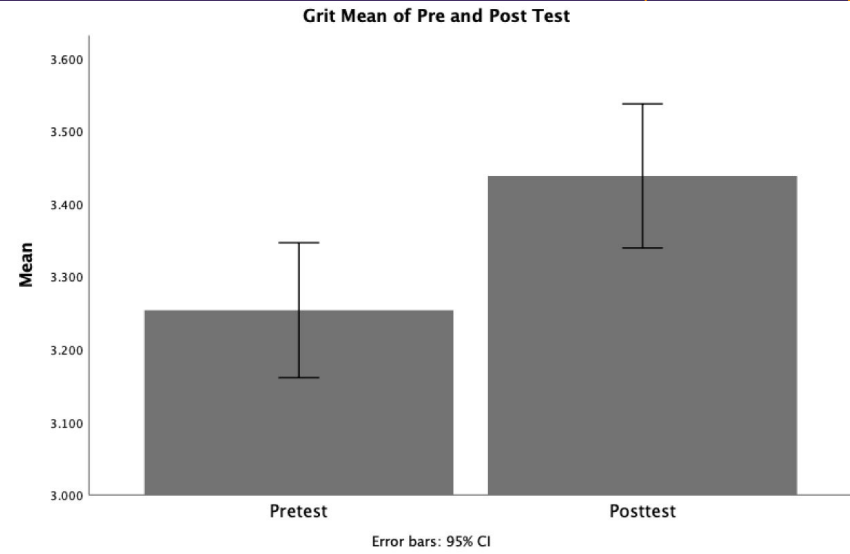


Figure 10: *A graph displaying pretest and post test grit means.*

Results for RQ3

Conclusion



Overall Summary:

- Argentina students had a higher grit post test than US students
- There could have been too many unidentified confounds that lead to low predictive power
- Significant gain seen between the two tests even though value was not great

Data Availability:

- The full dataset is with Ivon right now
- I did not use the full test in my results - only grit survey

Future Work:

- Longer exposure to MathSpring
 - Full curriculum?
- Looking to other countries?